The opinion in support of the decision being entered today was **not** written for publication and is **not** precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte THOMAS JACKSON
and
JIANNA WANG

Appeal No. 2005-1566
Application No. 09/763,948

HEARD: August 10, 2005

Before WALTZ, KRATZ, and PAWLIKOWSKI, **Administrative Patent Judges**.

PAWLIKOWSKI, **Administrative Patent Judge**.

DECISION ON APPEAL

This is a decision on appeal, under 35 U.S.C. § 134, from the examiner's final rejection of claims 1-8, 10-20, and 22-24.

Claim 1 is representative of the subject matter on appeal and is set forth below, with text in bold for emphasis only:

> 1. A device for electrical contacting or for the isolation of organic or inorganic semiconductors in electronic or optoelectric devices comprising
> a substrate, either in the form of

a) a contact material consisting of an organic or inorganic electrical conductor, or
b) an isolating material consisting of an organic or inorganic dielectric; and

a patterned or unpatterned **charge transfer material**, which is on or at a surface of the substrate and **which forms a charge transfer complex with an organic or inorganic semiconductor**,
wherein the charge transfer material
a) comprises charge transfer components in the form of donors or acceptors,
b) forms a self-assembling layer of one or more atomic and/or molecular layers,
c) has a direct or indirect bond to the surface of the substrate, and
d) forms a donor material in the charge transfer complex if the semiconductor is an acceptor or forms an acceptor material in the charge transfer complex if the semiconductor is a donor material.

Claims 1-8, 10-20, and 22-24 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Sato.

The examiner relies upon the following reference as evidence of unpatentability:

Sato et al. (Sato) 4,987,023 Jan. 23, 1991

With regard to claims under consideration in this appeal, to the extent that any claim has been separately argued, we consider such claim in this appeal. See 37 CFR § 41.37(c)(1)(vii)(September 13, 2004). We therefore consider claim 1 in this appeal.

We have carefully reviewed appellants' brief and reply brief, the examiner's answer, and the evidence of record. This review has led us to the following determinations.

OPINION

I. The 35 U.S.C. § 102(b) rejection of claims 1-8, 10-20, and 22-24 as being anticipated by Sato

The examiner's position for this rejection is set forth on pages 3-5 of the answer.

Beginning on page 4 of the brief, appellants state that an issue of dispute is whether the device of Sato is a "semiconductor" device. Appellants also extensively address this issue in the reply brief. For example, on page 5, appellant discusses whether a compound is a "semiconductor".

We review claim 1 to ascertain whether claim 1 requires a semiconductor.

Claim 1 recites, *inter alia*, a device comprising a substrate and a charge transfer material which forms a charge transfer complex with an organic or inorganic semiconductor. With reference to appellant's Figure 4 (Figure 4 is described on page 8 of appellant's specification, at lines 25-35; Figure 4 represents a thin-film transistor), the substrate is gate electrode 5, and the charge transfer material is layer 3. There is also shown a semiconductor material 6.

Claim 1 recites that the charge transfer material 3 "forms a charge transfer complex with an organic or inorganic semiconductor."

Thus, the issue is whether this recitation requires a semiconductor material adjoining the charge transfer material 3 (for example, the organic semiconductor material 6 as shown in Figure 4). That is, does claim 1 provide for a semiconductor material attached to the charge transfer material?

We look to the specification with regard to the description of the layers as illustrated in Figure 4. The specification, on

page 8, beginning at line 25, discloses that the charge transfer material 3 forms a charge transfer complex of the acceptor or donor material. Also, it is disclosed that an organic semiconductor 6 "is provided over the charge transfer material". On page 8, at line 13 of appellant's specification, the specification discloses that the charge transfer compound may be 2-mercapto 5-nitrobenzimidazole (MNB), and that the organic thin film transistor may be made with pentacene as the active semiconductor material.

In light of the above-mentioned disclosure, we determine that claim 1 falls short of reciting a semiconductor provided over the charge transfer material or attached to the charge transfer material. Claim 1 does not recite that a semiconductor is provided over the charge transfer material as described in the specification.

We therefore construe the claim limitation of "a . . . charge transfer material, . . . which forms a charge transfer complex with an organic or inorganic semiconductor" as providing that the charge transfer material has the ability (property) to form a charge transfer complex with a semiconductor.[1]

In view of the above claim construction, the next issue is whether the charge transfer material disclosed in Sato has the capability of forming a charge transfer complex with an organic or inorganic semiconductor.

We first note that on page 9 of the brief, last paragraph, appellants acknowledge that Sato's device provides for charge transfer between at least a part of the donor/acceptor molecules inside an organic thin-film. Brief, page 9. Hence, appellants

[1] On page 7 of the brief, appellants state the device of the invention has the "properties" of improved contacts for contacting organic or inorganic semiconductors in electronic devices.

recognize that Sato discloses a charge transfer material. Also, in the paragraph bridging pages 7-8 of the brief, appellants recognize that the acceptor and donor films of Sato are based on molecules having tetracyanoquinodimethane (TCNQ).

We next review appellants' specification for a description of what is a charge transfer complex.

On page 10, beginning at line 8 of appellant's specification, the specification discloses that the charge transfer material 3, as depicted in Figure 6, "contacts the active semiconductor 6 in the channel area." On page 10, beginning at line 13, the specification discloses that Figure 7 depicts an embodiment wherein layer 3 of charge transfer material is provided on an isolating material 4 outside the contact areas and forms a charge transfer complex with semiconductor layer 6. On page 10 beginning at line 23, the specification discloses that a charge transfer material in the form of arsenic or phosphor can be bonded with an arsenide or phosphide layer to the underlying contact material. Finally, on page 10 beginning at line 28, the specification discloses that arsenic or phosphor between the contact material and the semiconductor will be bonded to the former, but yet be able to "form a charge transfer complex **which provides charge carriers**" [emphasis added] for the semiconductor employed.

In view of the above, it appears that a charge transfer complex provides charge carriers for a semiconductor.

At the bottom of page 1 and at the top of page 2 of appellant's specification, the specification further discloses that it has been known to use organic molecular dopants such as tetracyanoquinodimethane (TCNQ). As an example, the specification discloses that a thin layer of TCNQ has been deposited, in vacuum, between an organic semiconductor layer and

source and drain electrodes of gold in a thin-film transistor. Specification, page 2, lines 1-4. On page 2, at lines 4-6, the specification also discloses that organic molecular charge transfer materials, such as TCNQ, deposited by evaporation or other simple methods, have a poor film-forming property and this limits their application.

Hence, by appellants' own admission, TCNQ has the property of being a charge transfer material for an organic or inorganic semiconductor. This is the very same material used by Sato, as discussed, supra. See Example 1, in columns 5-6, e.g., of Sato.

While we appreciate the extensive arguments made by appellants regarding whether the TCNQ layer of Sato operates with a "semiconductor" in Sato, in the context of the device of Sato, this is not pertinent, because, as discussed above, claim 1 does not recite that a semiconductor material is provided over, or is attached to, the charge transfer material. Appellants therefore are arguing a limitation that is not present in the claim.

Therefore, because Sato's TCNQ material is capable of forming a charge complex with a semiconductor, Sato anticipates appellant's claim 1. In this context, the findings made, on page 3 of the answer, by the examiner, that Sato discloses a charge transfer material which forms a charge transfer complex, is correct. In fact, appellants do not dispute that this finding is incorrect. What appellants argue is that the charge transfer material does not operate in conjunction with a semiconductor layer, in view of the type of device of Sato. However, as discussed above, this is an argument concerning a limitation that is not present in claim 1.

In view of the above, we therefore affirm the anticipation rejection.

II. Conclusion

The 35 U.S.C. § 102(b) rejection of claims 1-8, 10-20, and 22-24 as being anticipated by Sato is affirmed.

No time period for taking any subsequent action in connection with appeal may be extended under 37 CFR §1.136(a)(iv)(effective Sept. 13, 2003); 69 Fed. Reg. 49960 (Aug. 12, 2004); 1286 Off. Gaz. Pat. Office 21 (Sept. 7, 2004)).

AFFIRMED

THOMAS A. WALTZ
Administrative Patent Judge

PETER F. KRATZ
Administrative Patent Judge

BEVERLY A. PAWLIKOWSKI
Administrative Patent Judge

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